

Patent Claims

1. A gearbox module (1), particularly an automatic gearbox
 - 1.1 having a gearbox input (E) and at least one gearbox output (A);
 - 1.2 having a starting element (2) coupled to the gearbox input (E), comprising an input (5) and an output (6) that can be coupled at least indirectly to the gearbox output (A);
 - 1.3 having a gear-shifting device (3), comprising at least two inputs (7, 8) and an output (9) that can be connected to the gearbox output (A);
 - 1.4 a first input (7) of the gear-shifting device (3) is connected to the output (6) of the starting element (2) and a second input (8) of the gear-shifting device (3) is connected to the input (5) of the starting element (2);
 - 1.5 each input (7, 8) of the gear-shifting device (3) can be selectively connected by means of one synchronously shiftable coupling (16) to the output (9) of the gear-shifting device (3), thereby producing a first power branch (10) and a second power branch (11), whereby the two synchronously shiftable couplings (16, 17) enable power to flow via the power branches (10, 11) respectively alone or jointly in a closed state.
2. The gearbox module (1) according to claim 1, further characterized in that the output (9) of the gear-shifting device (3) is connected via at least one rpm/torque converting device (4) to the gearbox output (A) in order to produce at least one gear step.
3. The gearbox module (1) according to claim 2, further characterized in that the switchable elements of the rpm/torque converting device that can be actuated for producing the individual gear steps are designed as synchronously shiftable couplings.

4. The gearbox module (1) according to one of claims 1 to 3, further characterized in that, in all switched gears, it is free of any power transmission subject to slip.
5. The gearbox module (1) according to one of claims 1 to 4, further characterized in that the synchronously shiftable couplings (16, 17, 27, 37, 38) are designed as positively locking clutches.
6. The gearbox module (1) according to claim 5, further characterized in that the individual shiftable couplings (16, 17, 27, 37, 38) are each designed as a claw clutch.
7. The gearbox module (1) according to one of claims 1 to 6, further characterized in that the two power branches (10, 11) are arranged at least partially parallel to each other and, over a portion, parallel to the starting element (2).
8. The gearbox module (1) according to claim 7, further characterized by the following features:
 - 8.1 the gear-shifting device (3) comprises two back gears, a first back gear (12) that can be connected to the output (6) of the starting element (2) in a rotationally fixed manner and a second back gear (13) that can be connected to the input (5) of the starting element (2) in a rotationally fixed manner and that is free of any rotationally fixed coupling to the output (6) of the starting element (2);
 - 8.2 the first back gear (12) and the second back gear (13) are each connected via at least one back-gear shaft (20, 21) to a back gear (18, 19) that is connected to the output (9) of the gear-shifting device (3) in a rotationally fixed manner;
 - 8.3 the synchronously shiftable coupling (16,17) of each power branch (10, 11) is arranged here at one of the points named below in the power branch (10, 11):

- the connection of the first and/or second back gear (12, 13) to the output (6) or the input (5) of the starting element (2)
- the coupling of the first and/or second back gear (12, 13) to the respective back-gear shaft (20, 21)
- the coupling of the back gear (18, 19), connected to the output, to the respective back-gear shaft (20, 21)
- the coupling (9) of the back gear (18, 19) connected to the output (9).

9. The gearbox module (1) according to claim 8, further characterized in that the back gear (18, 19) of the respective power branch (10, 11), coupled to the output (9) of the gear-shifting device (3), can also be brought into connection with the back-gear shaft (20, 21) of the other respective power branch (11, 10).
10. The gearbox module (1) according to either claim 8 or 9, further characterized in that the individual back gears (12, 13, 18, 19) are designed as spur gear steps.
11. The gearbox module (1) according to one of claims 8 to 10, further characterized in that, in the axial direction as viewed between the gearbox input (E) and the gearbox output (A), the two back gears (18, 19) coupled to the output (9) are spatially disposed behind the first and second back gears (12, 13), and the synchronously shiftable couplings (16, 17) associated with the individual power branches (10, 11) each serve for connecting the two back gears (18, 19), connected to the output (9), to the back-gear shaft (20, 21).
12. The gearbox module (1) according to one of claims 1 to 7, further characterized in that the first and second back gears (12, 13) are arranged coaxially and parallel to each other in the axial direction.

- 13 The gearbox module (1) according to claim 12, further characterized in that the back-gear shaft (20, 21) of one of the two power branches (10, 11) is designed as a hollow shaft, through which the back-gear shaft (20, 21) of the other respective power branch (10, 11) is passed.
14. The gearbox module (1) according to either claim 12 or 13, further characterized in that the two shiftable couplings (16, 17) of the two power branches (10, 11) are arranged coaxially to each other and each serve to connect the back-gear shafts (20, 21) to the back gears (18, 19) that can be coupled to the output (9) of the gear-shifting device (3).
15. The gearbox module (1) according to one of claims 12 to 14, further characterized in that, in the axial direction, the second back gear (13) is arranged behind the first back gear (12) and the two back gears (18, 19) of each of the power branches (10, 11) that can be coupled to the output (9) of the gear-shifting device (3) are arranged downstream to the first and second back gears (12, 13).
16. The gearbox module (1) according to one of claims 1 to 15, further characterized in that arranged between the gearbox input (E) in the direction of power flow outside of the power branch (10, 11) and between³ the output (9) of the gear-shifting device (3) is a synchronously shiftable coupling that enables a direct through-drive between the gearbox input (E) and the gearbox output (A).
17. The gearbox module (1) according to one of claims 1 to 6, further characterized in that the gear ratios of the rpm/torque converting units arranged in the individual power branches (10, 11) are identical.

³ [Translator's Note] sic

18. The gearbox module (1) according to one of claims 1 to 17, further characterized in that the gear ratios of the rpm/torque converting units arranged in the individual power branches (10, 11) is different.
19. The gearbox module (1) according to one of claims 1 to 18, further characterized in that the rpm/torque converting device (4) arranged after the gear-shifting device (3) is constructed in a back-gear design and is connected via the second back-gear shaft (21) of the second power branch (11) to the gearbox output (A) with the formation of the output (9) of the gear-shifting device (3).
20. The gearbox module (1) according to one of claims 1 to 19, further characterized in that the starting element (2) is constructed as a hydrodynamic component (22).
21. The gearbox module (1) according to claim 20, further characterized in that the hydrodynamic component is designed as a hydrodynamic clutch (28), comprising a primary wheel (29) and a secondary wheel (30), which is free of a guide wheel.
22. The gearbox module (1) according to claim 21, further characterized in that the hydrodynamic component is constructed as a hydrodynamic rpm/torque converter.
23. The gearbox module (1) according to one of claims 19 to 22, further characterized in that a braking device (43) is associated with the output (6) of the starting element (2) and serves for holding the secondary wheel (30) in place and makes possible a support of the primary wheel (29) on it.
24. The gearbox module (1) according to one of claims 1 to 19, further

characterized in that the starting element (2) is designed as one of the following components:

- a hydrostatic gearbox, comprising a hydraulic pump, which is connected to a hydraulic motor;
- a power-source generating unit, whereby the power source is created by a fuel cell, a power-storage device, or an electric motor coupled to a power-storage device.